

SX-ISD

In-System Debugger/Programmer

SX-ISD is an in-system debugger and programmer for the SX series microcontrollers from Scenix Semiconductor. It uses the SX chip's built-in debugging capability to provide a low-cost emulation solution to its users. It allows users to run the target application in real-time, debug source codes and program a target SX device when design is complete. It connects to the parallel port of any PC and comes with a fully integrated development environment to allow users to effectively develop, compile, debug and program SX applications from start to finish. The SX-ISD supports currently available SX parts, including SX18/20/28AC and SX48/52BD.

To debug an application, special debug control codes need to be programmed to the SX chip in addition to programming the application program and fuse data. The debug mode also requires use of the two OSC pins and minimal program memory.

Debugging and programming with SX-ISD is provided via a 4-pin emulation connector which mates with a 4-pin 0.1 inch square post header in the target system. The connector is wired for OSC1, OSC2, VDD and VSS. Although the two OSC pins on the header are not isolated, users can keep the oscillator circuit components on the target as long as the RC components are within recommended specifications.

System Requirements

- Bi-directional parallel port
- IBM PC-386/486/Pentium or compatibles
- Win95/98/NT4 operating system
- 4 MB free hard disk space
- 4 MB RAM, 16MB recommended for O/S

Features

- Real-time, full speed execution
- High speed parallel port interface
- Source level support includes SASM, SXC and more
- Built-in in-system programmer
- Selectable internal frequencies dividing from 16mhz to 32.25khz
- Built-in frequency synthesizer, from 25khz to 50mhz
- Supports external oscillator circuit via External Oscillator Input clip
- Step, Run, Run to Cursor, Animate and break functions
- Writes to all registers for code testing
- One level software breakpoint
- Unlimited watch variables
- Conditional Animation Break
- Adjustable VDD supply from 2.5V to 5.6V in 0.1V increments
- 3-clip external probes: External Break Input, External Oscillator Input, GND
- Software animation trace captures three user-defined variables in addition to opcode, W, Mode, STATUS, FSR registers and the corresponding instructions
- Comes with SASM Assembler and Win95/98/NT IDE software



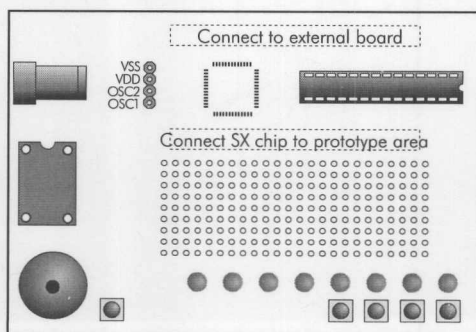
SX-ISD Debugger comes in a handy 5"x2"x1" anodized aluminum enclosure with three external clips including an external break input and a external OSC input. The debugger is connected to the target via a 4-pin socket wired for OSC1, OSC2, VDD and VSS.

Program Memory Used

SX28: 1FD-1FE, 6D0-7FE
SX52: 1FD-1FE, E90-FFE

The optional **SX Demo/Proto Board** allows demonstration and evaluation of the SX devices. It can be used independently by plugging a programmed SX28 into the socket or soldering a SX52 on the pads. It can also be connected to the SX-ISD Debugger via the 4-pin emulation header for programming and debugging. The components on the board include :

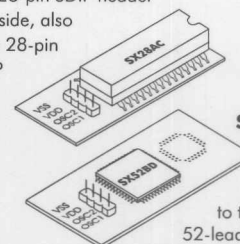
- 8 LEDs connected to PORTB and set high to light the LEDs
- Four push buttons for providing external stimuli to RB0-RB3
- Hardware RESET button to reset the processor
- A buzzer for audio output
- Proto typing area
- Connector area between SX I/O pins and prototype area
- Signal pins to connect Demo/Proto Board to target
- Socket for external crystal
- A connector for a 9 volt power supply



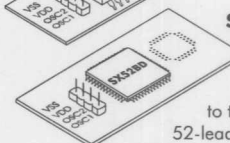
SX28 and SX52 chips are not installed on Demo/Proto Board.

Two optional **Emulation Adapters** are available which allow the debugger to mate directly with an 18-pin or 28-pin IC socket or 52-pin surface mount pads in the target application for in-system testing. These adapters isolate the OSC1 and OSC2 pins from the target circuit and allow any oscillator circuit components to reside on the target board.

SX28-HD: 28-pin SDIP header on the underside, also comes with a 28-pin to 18-pin DIP adapter for SX18 parts.



SX52-HD: 52-pin socket on the underside, this will be connected to the accompanied 52-lead QFP surface mount base which is soldered onto the target board.



Scenix SX-ISD In-System Debugger/Programmer

The SXIDE Software

The SX-ISD debugger comes with an Integrated Development Environment (IDE) which runs under Windows 95/98/NT. The IDE user interface is so intuitive that there is no learning curve to the system and users can be up and running within minutes. All information regarding the processor and the application is available right on the screen. It provides separate windows to examine source codes, data memory, special file registers and watch variables.

Special Function Tool Buttons

Load File - Loads hex or COD files to the IDE for debug Opens Device Configuration Window - Selects device type and fuse bit settings Compile - Compiles the source file using supported compilers like SASM and SXC Toggle Breakpoint - Quickly enables or disables current program counter as breakpoint Show Next Statement - Quickly returns to the next instruction to be executed after strolling through source codes Add Watch Variables - Isolates special variables to be inspected in a separate window Select Oscillator Source and Frequency - Selects one of the three oscillator sources supported by SX-ISD: internal crystal, frequency synthesizer or external oscillator input Run to Cursor - Executes codes in real-time from current program counter to the one highlighted by the cursor; can be used to step over or exit function calls Animation Trace - Enables saving the non-real-time program execution to a memory buffer Update Registers - Updates all registers in the current program states

Tool Bar and Buttons

- Tool buttons with tool tips for common functions
- Can be customized and be placed anywhere on desktop

Source Window

- Full editing capability
- Syntax sensitive display
- Context menu to compile, set font and color
- Tab set and search functions
- Next program counter
- Bookmark
- Breakpoint Indicator
- Multiple source windows can be opened for main program and include file modules

Data Memory Window

- Editable data displayed in hex, decimal or binary
- User defined font and color
- Updated registers highlighted for easy reference

WorkBook Mode

- File tabs for each opened source window provide easy navigation among files



Disassembled Window

- Splitter window shows both disassembled codes and corresponding source lines
- Functions for redirecting program counter
- Current program counter cursor (arrow) and line cursor (reversed bar)

Status Bar

- Displays context sensitive help information on the left
- Line and column numbers of text cursor if focus is in source window; else, display the address of set breakpoint
- Processor mode: Run, Halt or Wait
- Current program counter
- Oscillator source and frequency
- Current device

Special Register Window

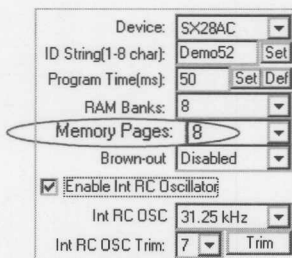
- Updated registers are highlighted for easy reference
- Registers are displayed in separate pages for SX48/52
- Register editing capability
- Registers displayed in hex, decimal, binary and ASCII
- Adjustable column width to hide unwanted display formats
- User defined font and color

Program Memory Window

- Displays the opcodes being debugged
- The same codes reside in the SX chip under test

Watch Window

- Displays assigned watch variables in hex, decimal, binary and ASCII
- Watches can be set at word, byte, bit level or as long variables
- Modifies value of watch variables in the window

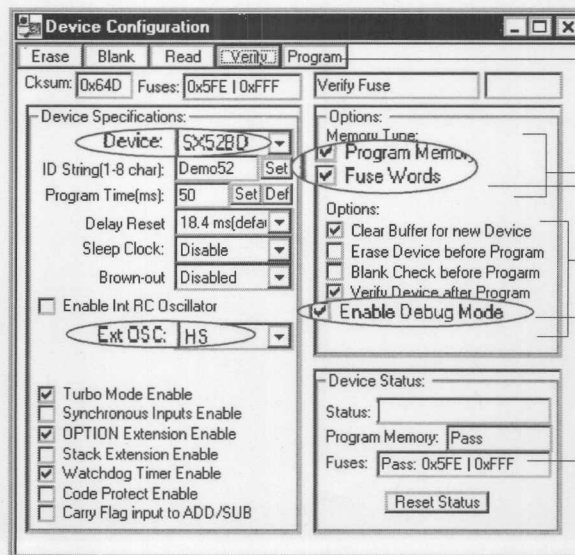


Device Specifications

- Selects device type and fuse data
- Supports embedded fuse and ID string
- Provides TRIM function if internal RC OSC is used

Debug Mode Requirements:

- Set correct device type
- Selects Ext OSC in HS or XT modes
- For SX28, "Memory Pages" needs to be set to 4 or 8
- Program both memory and fuse words to chip
- Checks the "Enable Debug Mode" option



Function buttons

Options

- Selects the memory types to be included in the selection function
- Makes sure both memory types are programmed for debugging
- Selects functions to be included in programming
- **Enable Debug Mode** - check this option to engage the SX chip in debug mode

Device Status

- Displays program status and results of the programming function
- Displays FUSE and FUSEX values read back from the chip